

# THE STING



By Vince Micchia

Photos By Ron Harris

## A GENTLE AEROBATIC SPORT SHIP THAT WILL DO THE PATTERN, THE STING TIED FOR SECOND PLACE IN THE RCM 1979 DESIGN CONTEST

**Q**uick and easy is the name of the game today. Quick to build and easy to fly. Well, if that's what you're looking for, search no more, as The Sting is here at last.

This design has been bugging me for about a year now, so the decision was made to put it on paper and try it out. I hope you like it enough to try it yourself.

After spending some time on the drawing board, the pencil lines were completed at last. The purpose in mind was to keep The Sting as simple as

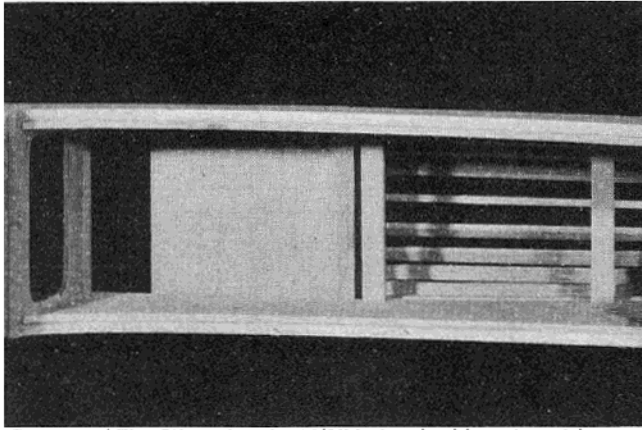
possible and still maintain semi-modern lines.

The airfoil used is the same that was used on the SST 40 which is kitted by Hobby Shack. The control surfaces of The Sting are generous enough to have full control of the model even at very low speeds. The overall construction of The Sting has been kept simple with no difficult planking or carving. The Sting tips the scales at five pounds and, for a .40 powered model with the wing area of over 600 square inches, leaves the

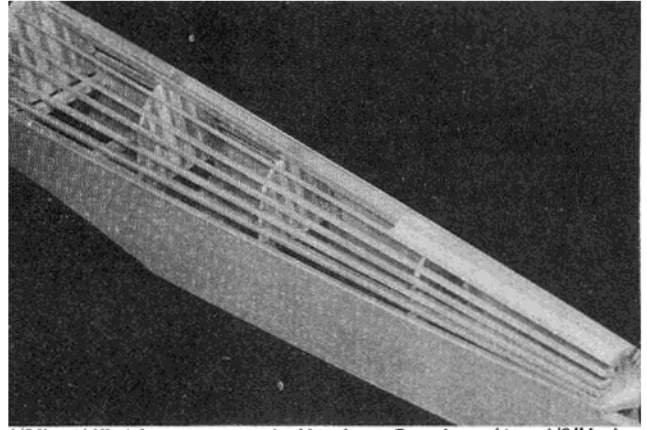
power loading in the low numbers.

After spending some time at the local hobby shop, buying up some of the materials needed to start construction, I couldn't wait to get back to the shop to start The Sting. I'm sure many builders have felt the same when starting a new model.

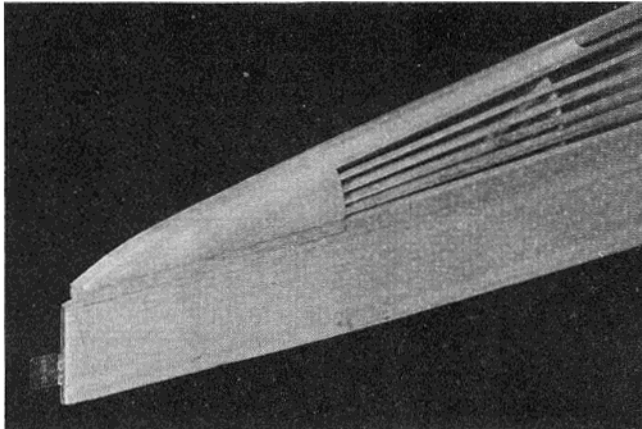
That evening much to my surprise the fuselage was practically finished. I find one of the best methods of cutting out parts, when building from plans, is to trace the parts on tracing paper or



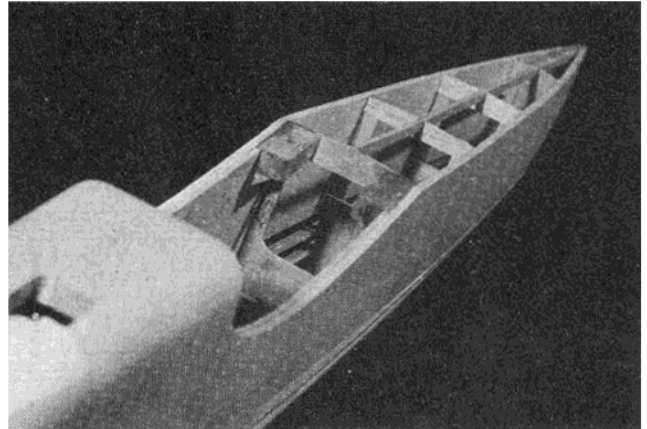
*Bottom of The Sting showing 1/8" balsa doublers, top stringers, and hardwood servo rails. Note 3/8" triangular strip shown just forward of servo rail, shown on plan but not described in text.*



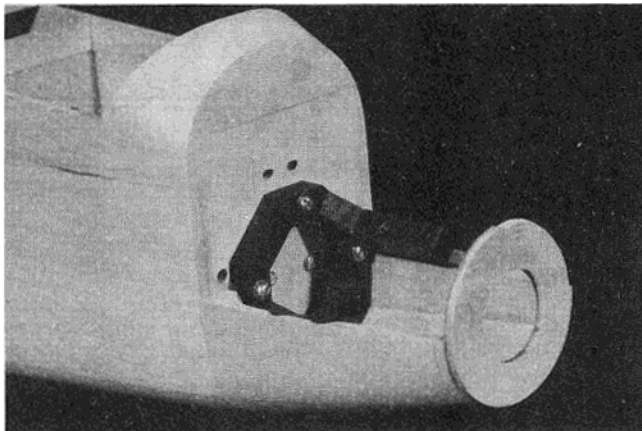
*1/8" x 1/4" stringers cemented in place. Bevel sand two 1/8" balsa strips and cement them to the three top stringers to support the dorsal fin. Cement the stringer to the center marks on F-8.*



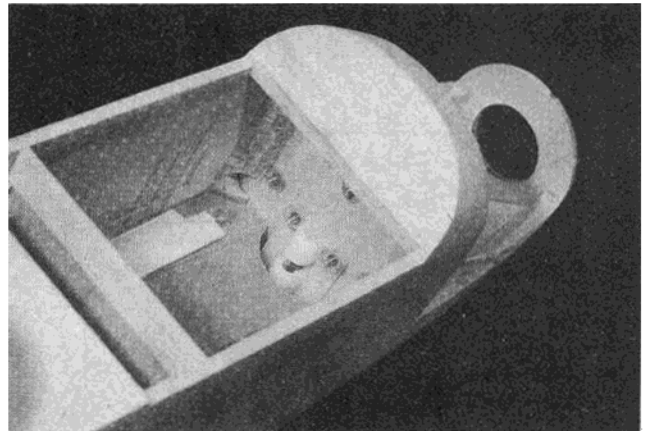
*Tail blocks sanded to shape to conform with fuselage and stringers. Note offset on tail block to clear 1/4" dia. dowel elevator joiner.*



*Bottom view showing rear wing-hold down blocks and 1/8" x 1/4" bottom stringer.*



*Front end of The Sting showing the dash block. Motor mount set at 45 degree angle bolted in place with 4-40 machine screws. Note cut out area on nose ring for top cowl.*



*Tank compartment showing Goldberg nylon bearing block and groove to clear steering arm.*

velum. Cut the part from the paper leaving 1/8" to 1/4" margin from the part. Cement the paper to the wood with rubber cement. Cut the part out, remove the paper, and wipe the part clean. The rubber cement will peel right off easily.

Two weeks later, working two or three hours an evening, The Sting was finished. So here we sit writing an article of the events that took place, and how The Sting goes together. As of this writing The Sting has been test flown

and a few photos taken of it.

The first day we tested The Sting, there was no wind blowing, so the time was ideal. We did a distance check which really wasn't necessary since the receiver had been used before. The K & B .40, with a Top Flite 10/6 prop up front, was started. First off, to get rid of the jitters, The Sting and I did some ground handling. I got it to the far end of the field and made ready for take-off.

I was again surprised in what little time

it took for The Sting to get airborne. I would say 25 to 30 feet and The Sting was up and away. After flying it at moderate speed for the usual two or three laps around the flying site, the time had come to put it to work. First a very large loop was tried at full power all the way around. If the wing was going to go, I'll know at the bottom. I also checked for flutter — there was none. Next we did a roll. It rolls well, but you will have to use a little rudder when the wing is vertical on

both ends of the roll. Cuban Eights were done with no problems at all. Inside and outside loops --- no problems. I went up for spins and got a spiral dive, so more throw was added to the rudder after the first flight. There is no problem in spinning now.

In inverted flight, The Sting hangs right in there. Now that the fuel must be getting low, The Sting was made ready for landing. I throttled back but not quick enough, as I over-shot the field and had to go around again. This time the landing was just about as good as can be seen anywhere. The Sting was flown a few more hours, with no dings or broken props. As far as I'm concerned that was the end of a perfect day. I am very proud of The Sting and I know if you decide to build it, you will be too. So all you guys and gals out there in the modeler's world, let's get to the shop and build this thing called The Sting. This model is intended for the modeler who has flown four channel high wing trainers, and has some experience flying. The Sting is an advanced trainer. Now that we have come this far, read on, as the instructions are next.

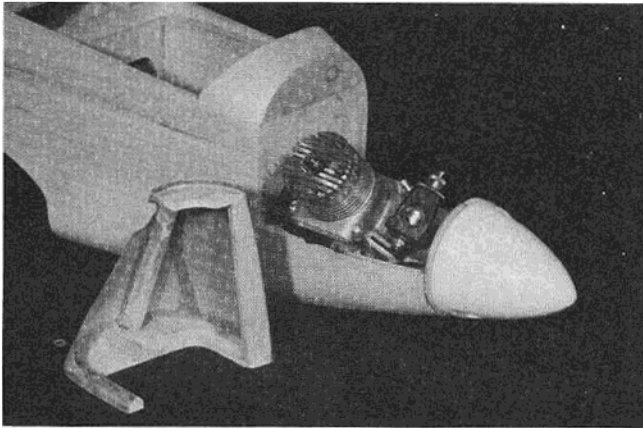
#### **Fuselage Construction:**

Shown above the side view on the plan is the bottom view of The Sting. For those who have never built a low wing

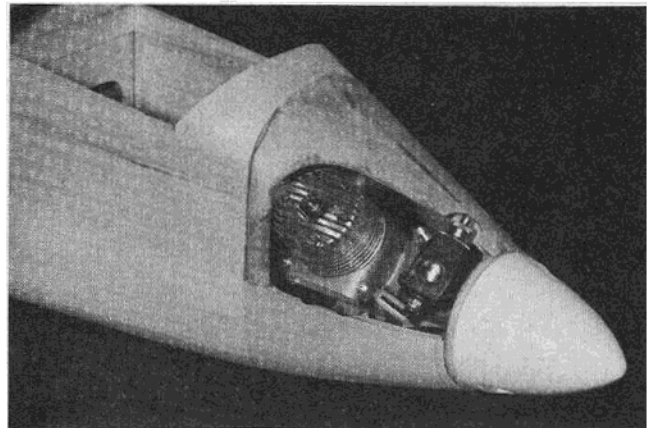
before, this view will assist you when the time comes for servo installation.

Begin by cutting the fuselage sides out of 3/16" x 4" x 42" balsa. (Save the scrap for rudder and fin later.) Mark the location of the bulkheads with a soft lead pencil or ballpoint pen. From 3/16" balsa make two F-2T and cement them to the top front edge of the fuselage, and allow room for the dash block to be cemented there later. Cut the firewall (F-1) from 3/16" plywood. The drilling instructions are just below it on the plans. You may choose the method here as to upright engine or 45 degree slanted. If slanted engine is to be used, the bottom blind nut on the back side of the firewall will have to be inset so as not to interfere with the front landing gear bearing block. After drilling all necessary holes in the firewall, cut F-2 and F-3 from 1/8" plywood. Tape the rear end of the fuselage sides together, making sure that they won't slip, and that they are square and even with each other. So keep your eye on that as you cement parts between the fuselage halves.

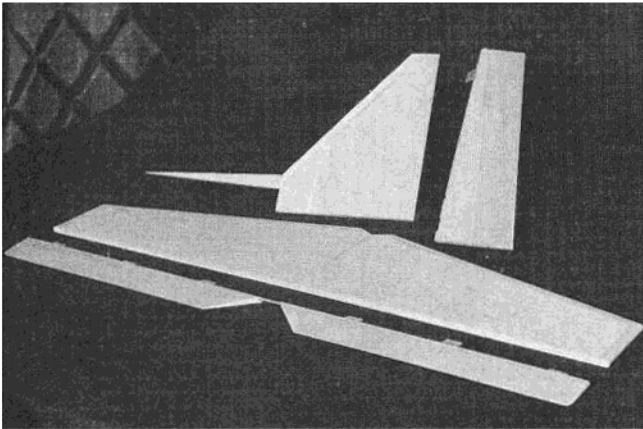
Cement the firewall in place with 5-minute epoxy and wipe the inside corners of excess cement since 3/8" triangular strips are to be cemented in later. Cement F-2 and F-3 in place next. Cut 3/8" triangular strips and cut a



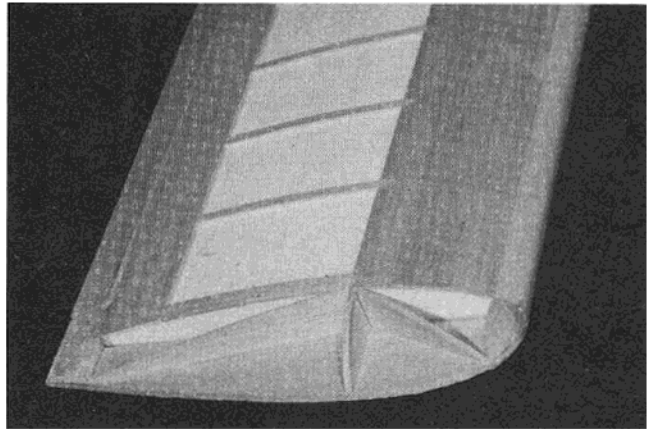
*K & B .40 engine in place. And an inside shot of the cowl. Note two grooves cut on top edge of the bottom cowl block for screwdriver, to remove engine mounting screws.*



*Cowl in place and is hinged on the left side. Cowl has to be opened for refueling.*



*Completed tail assembly. The fin is cemented into the top of the tail block after the spacer has been removed. The "V" cut on the front of the stab is cemented to stab mount.*



*Built up wing tip is optional. Prototype used solid tips and foam core wing.*

groove for steering arm clearance on one of the triangular strips and cement them in place. Cut two 3/8" triangular strips to fit along both sides of the fuselage bottom and to fit from F-1 to F-2 as shown on the side view. Cut two F-1A parts from 3/32 or 1/8" balsa and cement them to each side of the fuselage's interior, just to the top edge of the 3/8" triangular strips. This is the base for the tank floor.

Cut the rest of the bulkheads from 1/8"

balsa. Cement F-6 and F-7 together and forget the top pieces for now. F-4 is cemented in place next. The fuselage sides may have to be pulled together at this point. I used masking tape here and it worked fine. Cut and cement tank floor as per plan. The tank floor will slip into the tank compartment from the top and is cemented to the top edges of F-1A.

Take the tape off the rear of the fuselage and sand to shape as per bottom view, or so that both of the

fuselage sides (when cemented together) are 3/16" thick. See bottom view at rudder hinge point. Cement the rear of the fuselage together evenly at the back edge and squarely across the top. Cement F-8 in place. Cement F-5T, F-6T, and F-7T in place. Cut F-3 from 1/2" balsa. If you don't have 1/2" balsa, laminate two 1/4" sheets together. Plank the flat portion of F-2T as shown on the plan. This is planked half way so you can

## THE STING

Designed By : Vince Micchia

### TYPE AIRCRAFT

Sport & Advanced Trainer

### WINGSPAN,

58 Inches

### WING CHORD

11 Inches

### TOTAL WING AREA

637 Square Inches

### WING LOCATION

Low Wing

### AIRFOIL

Semi-Symmetrical

### WING PLANFORM

Constant Chord

### DIHEDRAL, EACH TIP

1 1/4 Inches

### O.A. FUSELAGE LENGTH

48 Inches

### RADIO COMPARTMENT AREA

(L) 10" x (W) 2 3/4" x (H) 3"

### STABILIZER SPAN

23 1/2 Inches

### STABILIZER CHORD (incl. elev.)

6 1/8" Average

### STABILIZER AREA

140 Square Inches

### STAB AIRFOIL SECTION

Flat

### STABILIZER LOCATION

Mid-Fuselage

### VERTICAL FIN HEIGHT

8 Inches

### VERTICAL FIN WIDTH (inc. rudder)

6 1/4" Average

### REC. ENGINE SIZE

.40 Cu. In.

### FUEL TANK SIZE

8 Ounces

### LANDING GEAR

Tricycle

### REC. NO. OF CHANNELS

4

### CONTROL FUNCTIONS

Rud., Elev., Ail., Throt.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa and Ply  
 Wing ..... Balsa and Ply (or Foam)  
 Empennage ..... Balsa  
 Weight Ready-To-Fly ..... 80 Ounces  
 Wing Loading ..... 18 Oz./Sq. Ft.

see what's going on in the tank compartment when installing the other parts. Before cementing F-4 to F-3, check the distance from the bottom of the notches of F-4 to the top edge of F-3. Use a 1/8" x 1/4" stringer to measure this on the top and sides. Mark this and cement F-4 to F-3.

Start with the top stringer, cement into the notch on F-4 and to butt to the back side of F-3. Use Zap here, and epoxy from underside later. Cement the top stringer straight down the center of the fuselage, and aligned on the center of F-8. The lines on F-8 represent the centers of the 1/8" x 1/4" stringer locations. Cement the stringers, working down both sides of the fuselage. One stringer on one side and one on the other side, keeping them in the same location on each side. After all stringers are cemented evenly in place, use epoxy to secure the stringers to the bulkheads. Cement tail doublers in place next.

The tail blocks are next. Tack the tail blocks together as shown on plan. Sandwiching a piece of 3/16" balsa to simulate the thickness of the fin between the two blocks, and a 1/4" thick balsa to simulate the stab. Lay this unit in place and mark the bottom with pencil. Mark the side as per drawing. Now cut and shape to conform with fuselage.

Carefully cement just the blocks to the rear side of F-8. These blocks can stay there until the fin and stab are ready to be installed. Before cementing fin and stab in place, remove the 3/16" balsa and the 1/4" balsa which will leave slots for them. Bevel sand two pieces of 1/8" balsa to fit flush between the three top stringers at the top rear of the fuselage to support the dorsal fin.

Now to finish the front of The Sting. Cut the side cowl blocks from 5/8" balsa. If you don't have 5/8" balsa, do it as shown on the plan, by laminating 1/8" balsa to the 1/2" balsa. Epoxy these blocks to the front of the firewall as per plan, bottom view. Cut the nose ring from 1/8" plywood. Install the motor mount and engine. Hang nose ring on prop shaft. Screw the back plate of spinner onto the shaft and line the plywood nose ring up with the back plate, and epoxy the nose ring in place.

Remove the engine and mount and cement the 3/8" balsa bottom cowl block in place. Cut two 3/8" triangular strips to fit the interior of the engine compartment bottom, and cement in place. Coat the engine compartment with epoxy.

Now shape the bottom front of the fuselage from the front of the wing saddle to the nose ring. Install the front wheel bearing, fuel tank, and throttle pushrod. Cement the dash block in place and plank the rest of F-2T. Shape the dash block to conform with top of the nose ring.

The cowl is next. Begin by cutting and framing the top of the engine compartment with 3/16" balsa. Remove this frame and wrap 1/64" plywood around the frame and Zap the plywood to the frame. Trim excess plywood away. Coat the outside of the top cowl with contact cement and apply another sheet of 1/64" plywood. Cut out for your engine. This is the way it was done on The Sting, and it works just fine. Coat the inside of the top cowl with epoxy. The hinges are set in by using pins and epoxy cement, when model was finished.

Cut the doublers from 1/8" balsa and cement them to the interior of the fuselage. You may want to change the notches of the servo rail locations to fit your servos at this point, so be careful here. The C.G. shown on the plan is right on the money, but the model should fly well 1/2" either way.

Cement the hardwood rear wing mounts into place backed up with 3/8" triangular strip to the top of these pieces as shown on the plan. Install servo rails and servos. Install pushrods for rudder and elevator. These two pushrods exit in the same locations on both sides of the fuselage. Before planking the bottom of the fuselage, secure the pushrods to the bulkheads by cutting three pieces of 1/8" x 3/4" balsa to fit across the bulkheads. Locate the holes of the pushrods and cut holes into these cross braces to fit each pushrod. Cut across these pieces to split the holes and keep them together. Cement these cross members to the corresponding bulkheads and to the pushrods on the inside of the fuselage. When all of the pushrods are secured, plank the bottom of the fuselage with 3/32" balsa (cross grain).

The windshield pattern is made by wrapping a piece of 8 1/2" x 11" paper around the top of the dash block at the same angle and mark the paper as to where the windshield is to fit on the fuselage. Maintain a 1/4" border for cement. Lay the pattern under the plastic and score with an X-Acto knife and just crack the windshield out. The one shown on the plan is optional. The next Sting will have the windshield wrapped around the whole cockpit.

#### **Built-Up Wing Construction:**

Notice that the bottom rear 2/3 of the ribs are straight for ease of construction. Begin by laying waxpaper over the wing portion of the plan. Pin the 3/32" x 1/4" balsa bottom trailing edge sheet in place over the plan. Cut all the ribs from 3/32" balsa. The bottom of the main spar will have to be shimmed up about 1/8" during construction to fit the bottom of the ribs. Pin the bottom spar in place over the plan. Now use one of the ribs as a gauge to find the location of the 3/16" square rear bottom spar, and cement

this spar to the top of the trailing edge sheet. Cement all but the four center ribs in place. Cement the 1/4" x 1/2" top main spar and the 3/16" square rear spar into the top notches of the ribs.

Cut all the dihedral braces and the four half ribs from 1/8" plywood. Remove pins and elevate both wing tips up 1/4" and trim the center section until all spars butt together. Cement the dihedral braces to their respective places with epoxy cement. Now cement the two center ribs together and cut them to fit the center of the wing. Cement the other two ribs to butt the edges of the plywood dihedral braces. Cement the top 3/32" x 1/4" top trailing edge sheet in place. With a sanding block, square off the trailing edge of the wing at this point, and cement the 3/16" x 5/8" balsa cap in place. Cement the leading edge in place and allow space for the 3/32" planking at the front edge of the ribs. Plank the top and bottom of the leading edge with 3/32" x 3" balsa sheets. Plank the center section and make cut-out for the aileron servo as shown on the plan. Cement 3/32" x 1/4" cap strips to the top and bottom of the ribs. Cut and epoxy the hardwood main landing gear mounts in place. Cut and fit 1/4" diameter front wing hold-down dowel to front of wing.

Cut the trailing edge stock to make unit for strip ailerons and cement in place at rear center section of wing. Shape ailerons and set hinges as per plan. Do not cement hinges in place yet. Bend the 5/32" diameter music wire landing gear per the pattern shown on the plan. The landing gear is held in place with four two hole metal or nylon straps and eight wood screws. The foam wing follows the same format except the spars. Both wings, built up or foam, will have to be fiberglassed top and bottom in the center section as per plan. Cut two 1/16" plywood washers to fit to the bottom of the wing at the mounting holes. On the plan two types of tips are shown. You can choose which one you want to use. We used the solid wing tips on The Sting. Make the fin and rudder from 3/16" balsa and the stab and elevator from 1/4" balsa, joined together with a 1/4" dowel.

After all the construction is finished, the entire model was covered with MonoKote. On the sections, such as the stab that fits into the fuselage, and the top where the dorsal fin goes, the covering will have to be neatly cut away to be able to get a good glue joint. Cement all hinges in place with epoxy cement. The rudder is the last piece to be installed.

Be careful putting The Sting together. Fit first, cement later, and when the model is finished you will have a model that not only looks good but flies good also.

Good Luck and Happy Landings. □